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A4L LBBA L108 L109 L147 L148

(56) Documents Cited
GB 2238717 A GB 2220848 A GB 2215594 A
EP 0232237 A2 EP 0155784 A2

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UK CL (Edition M) A4L LAAR LBBA LBEJ LBLA LBLC LBLE LBME
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ONLINE DATABASES:EDOC.

(54) **Child seat for vehicle**

(57) A child seat for use in a vehicle comprises a separate back rest 3 and seat unit 2, which may be linked together either detachably or fixedly by means of differing positions of engagement between a hook 7 on the back rest and a shaft 6 on the seat unit.

Fig. 1

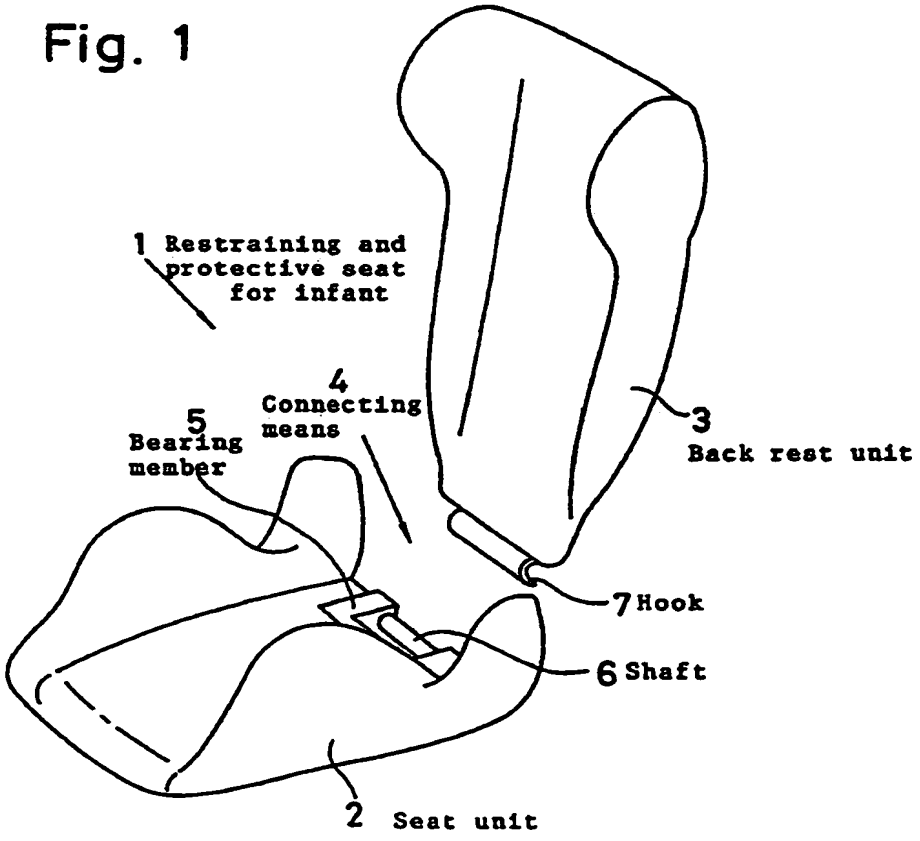

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Fig. 1

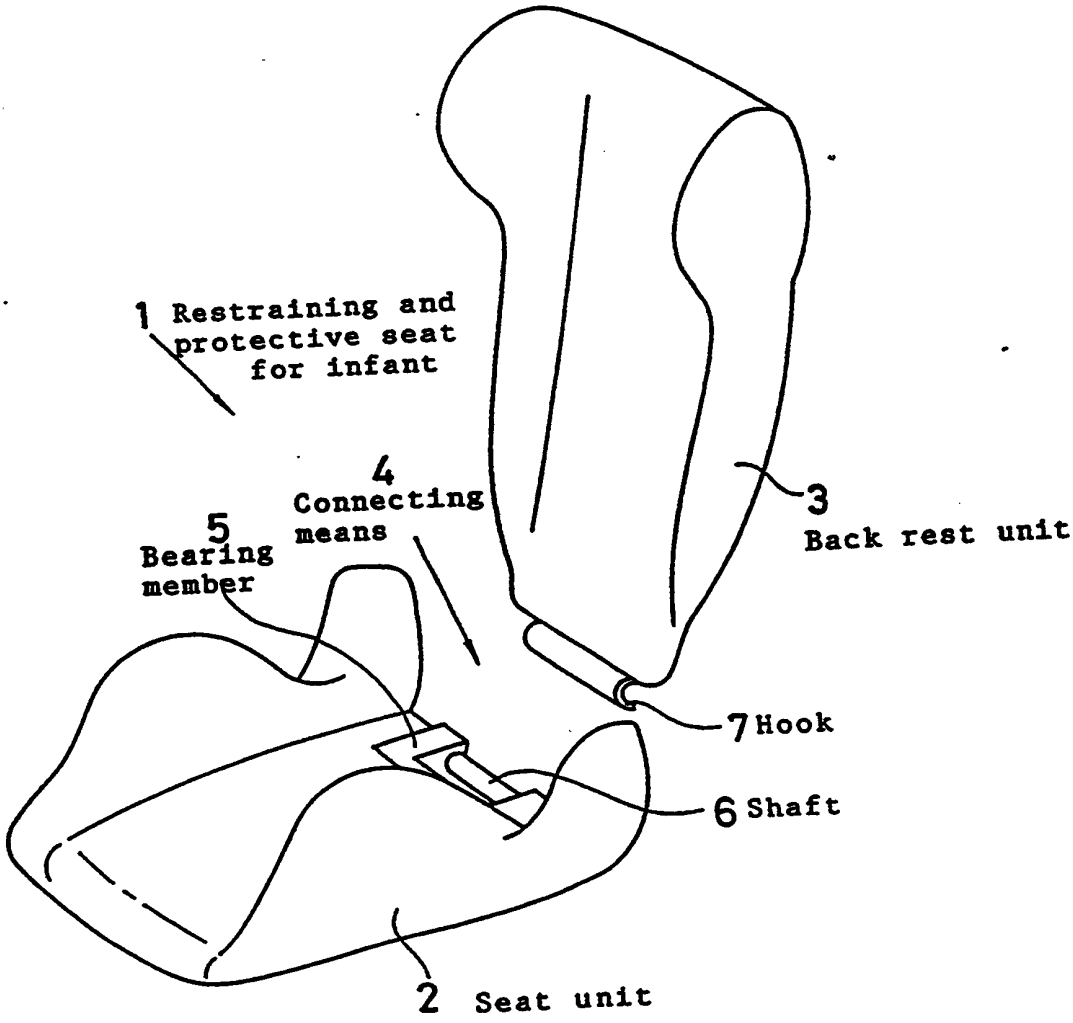

1 Restraining and protective seat for infant
4 Connecting means
5 Bearing member
3 Back rest unit
7 Hook
6 Shaft
2 Seat unit

Fig. 2

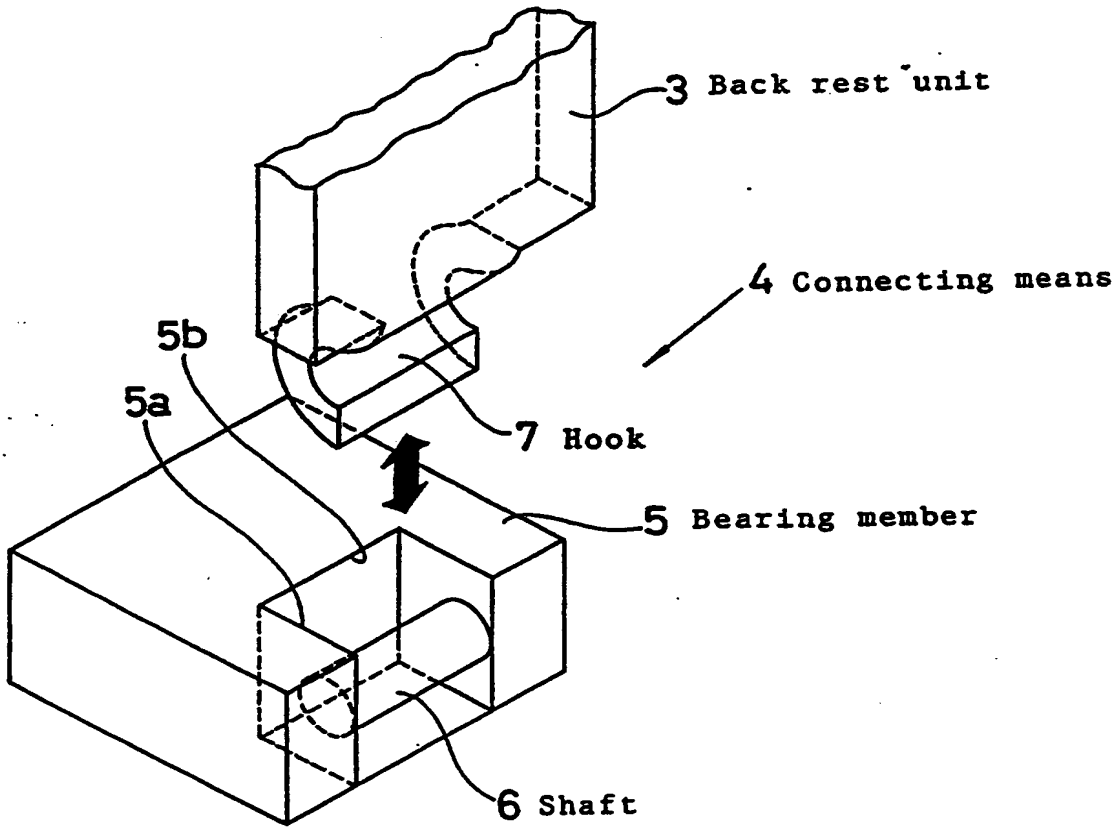

3 Back rest unit
4 Connecting means
5b
5a
7 Hook
5 Bearing member
6 Shaft

Fig. 3

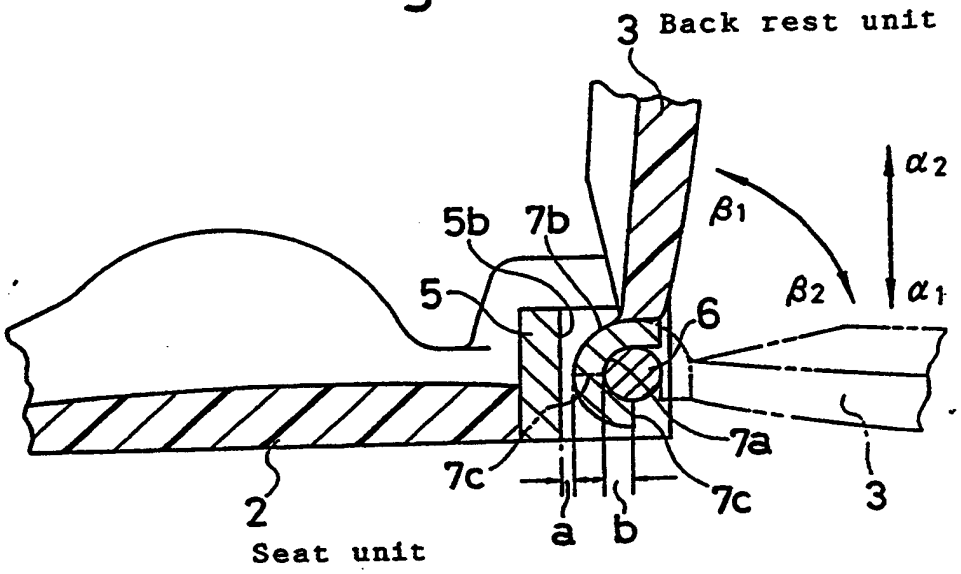

3 Back rest unit
α_2
β_1
5b 7b
5
β_2 α_1
6
7a
7c
7c
3
2
Seat unit
a b

Fig. 4

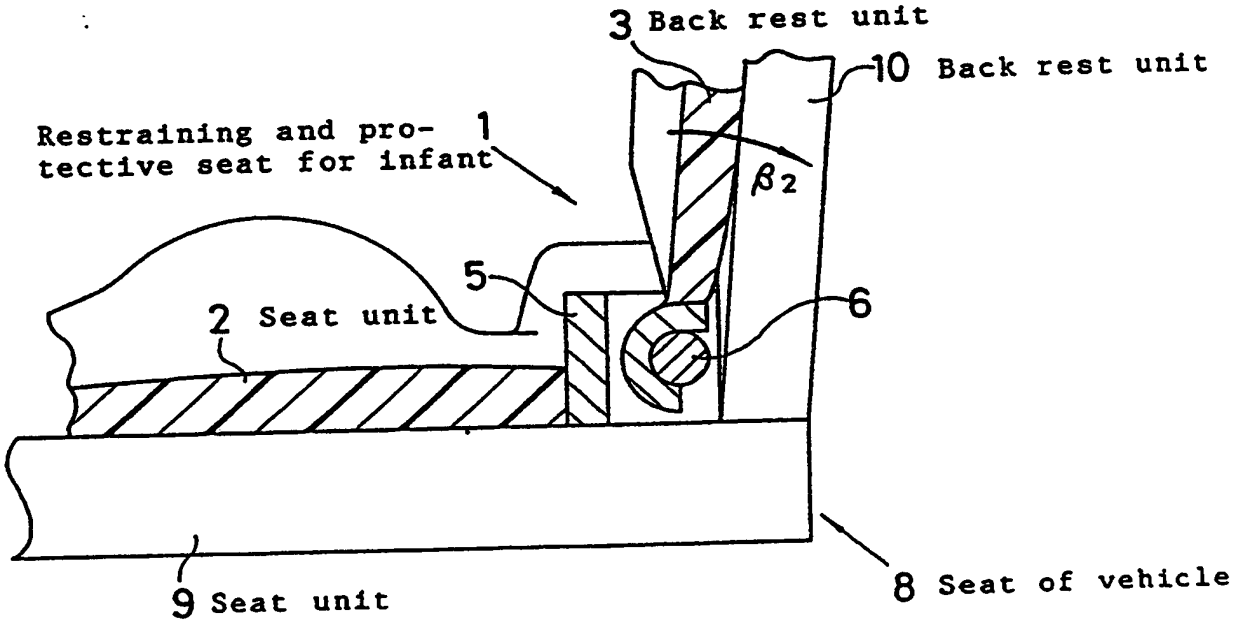

3 Back rest unit
10 Back rest unit
Restraining and protective seat for infant 1
β_2
5
6
2 Seat unit
9 Seat unit
8 Seat of vehicle

Fig. 5

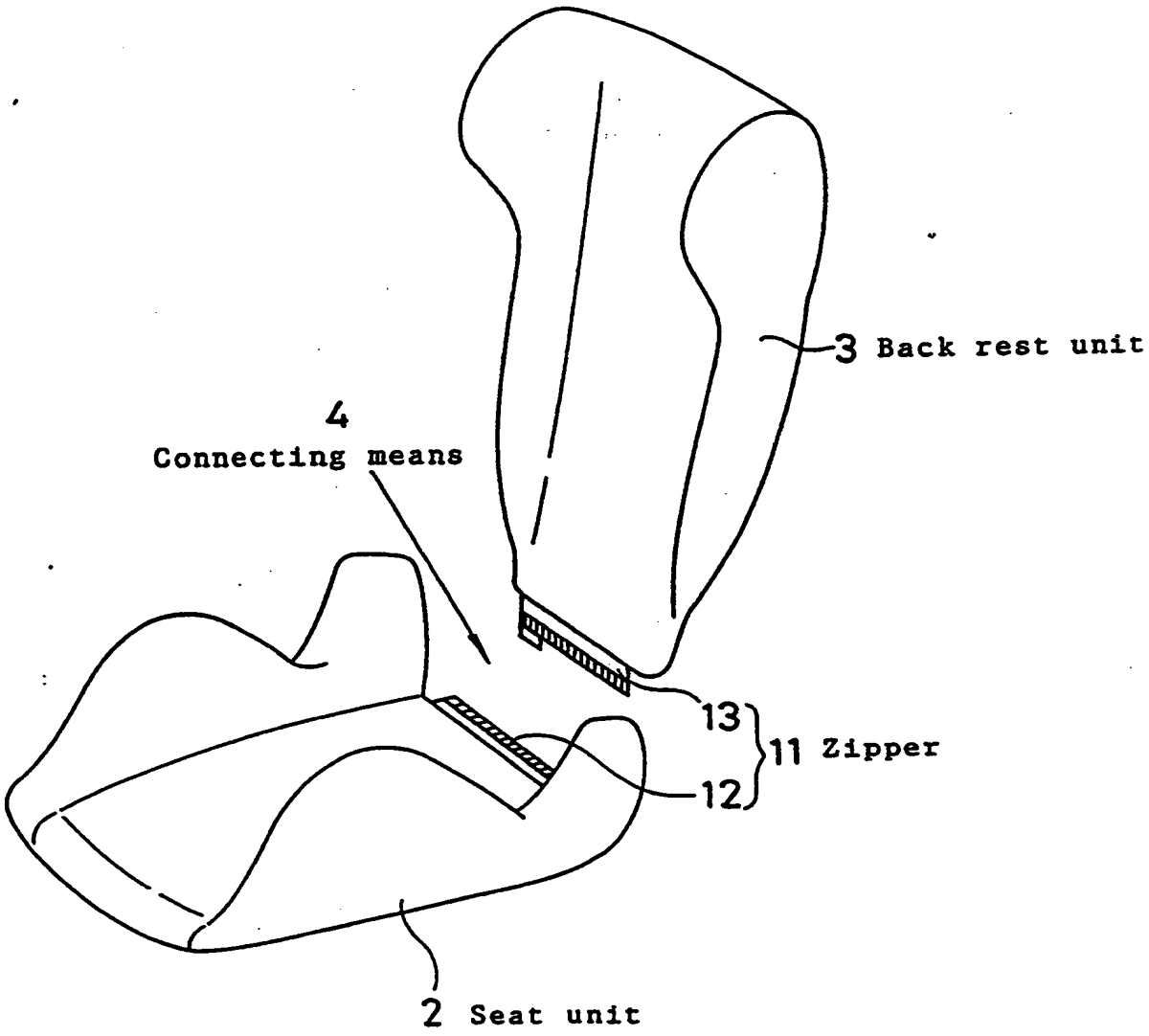

3 Back rest unit
4
Connecting means
13
11 Zipper
12
2 Seat unit

Fig. 6

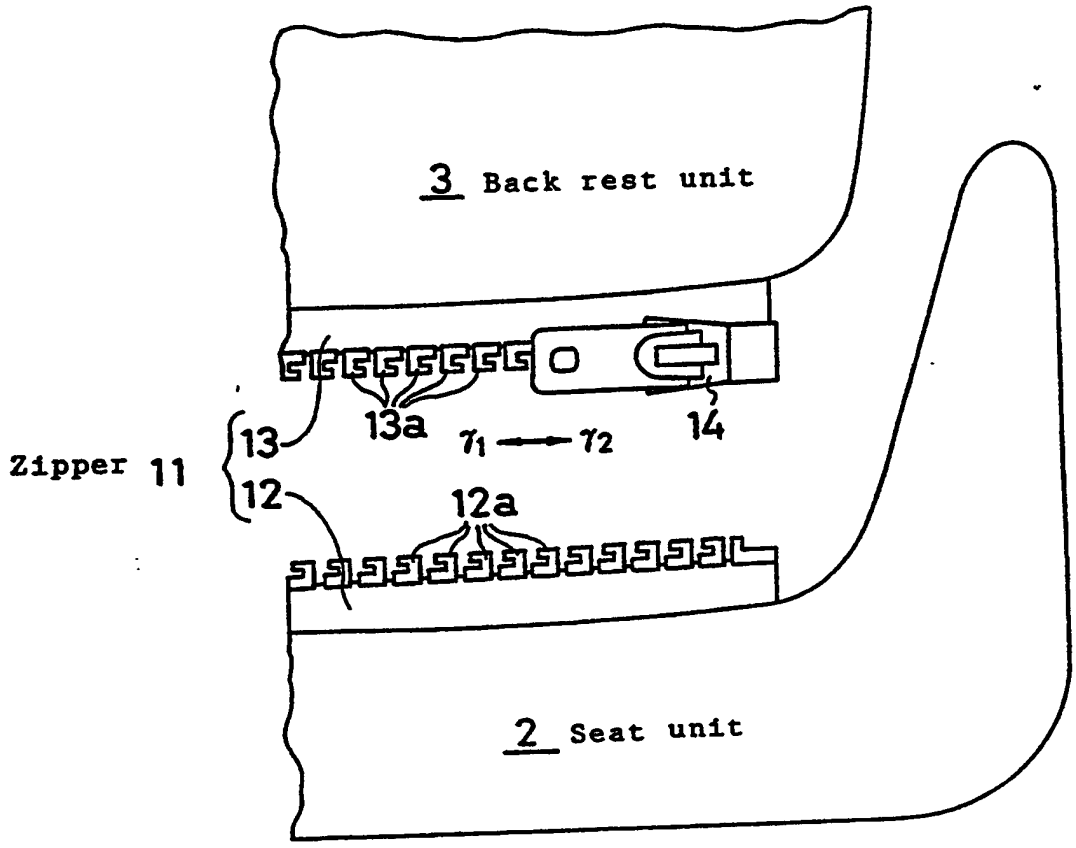
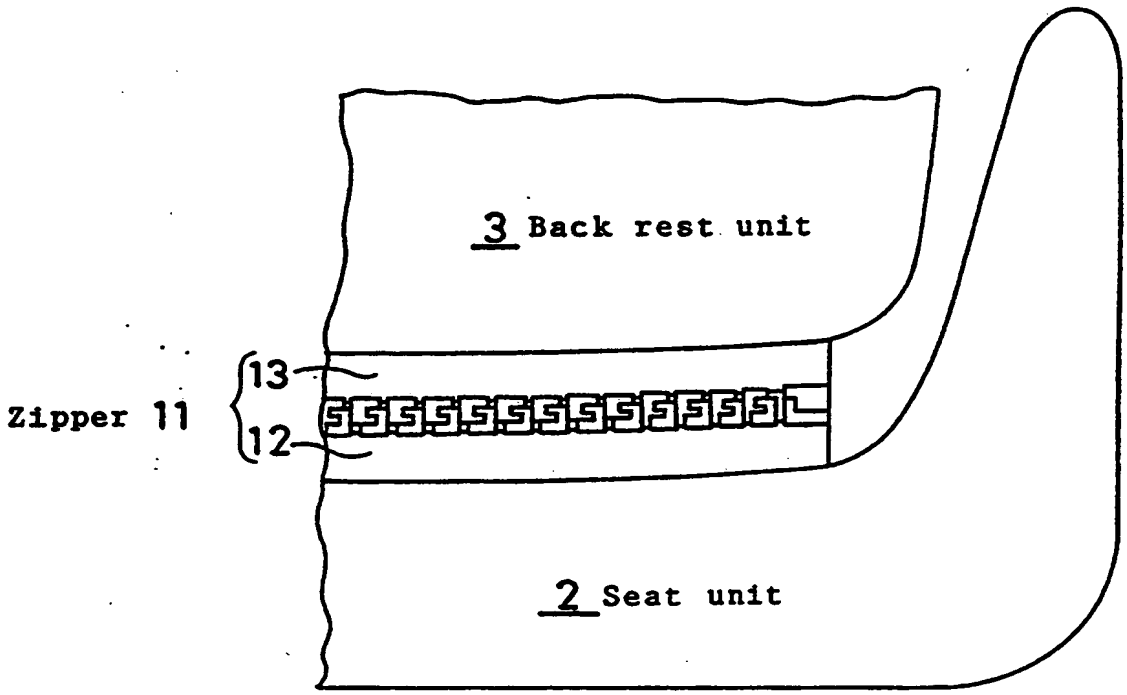

3 Back rest unit
13a
$\gamma_1 \longrightarrow \gamma_2$
14
Zipper 11
13
12
12a
2 Seat unit

Fig. 7



CHILD SEAT FOR VEHICLE

The present invention relates to a restraining and protective seat for infant used on a vehicle, where the infant is seated, and used on a seat of a vehicle such as automobile, whereby the seated infant is restrained and protected by a seat belt unit attached on the vehicle, and in particular to a restraining and protective seat for infant on vehicle, which comprises at least a seat unit where the infant is seated and a back rest unit, to which the infant leans, whereby the seat unit and the back rest unit are removably connected together.

In a vehicle such as automobile, airplane, etc., seat belt unit is provided on seat of the vehicle. In general, the seat belt unit comprises a webbing for restraining an occupant, a tongue connected to the webbing, a buckle device rigidly mounted on the vehicle and removably engageable with the tongue, and a seat belt retractor, which winds up the webbing by relatively low take-up force, allows the webbing to be pulled out by pulling force higher than the take-up force in normal case, and blocks pulling-out of the webbing in case of emergency.

As such a seat belt unit, there is a three-point seat belt unit, and the webbing in this three-point seat belt unit comprises a shoulder belt and a lap belt. The shoulder belt restrains and protects shoulder, chest and belly of

the occupant, while the lap belt protects legs of the occupant.

Meanwhile, the three-point seat belt unit of this type is generally designed in such manner that the webbing correctly fits an adult occupant. For this reason, when an infant is seated on the vehicle seat and the infant is restrained by this three-point seat belt unit, the webbing does not fit correctly the body of the infant. In particular, the shoulder belt is designed to fit shoulder, chest and belly of the occupant. Thus, in some cases, setting position of the webbing is extremely deviated from normal setting position for the infant, and the webbing may be brought into contact with neck of the infant.

To solve the problem, Japanese Utility Model Publication 2-49070 describes an infant restraining device for vehicle, in which webbing can be set to correctly fit an infant seated on the vehicle seat when the seat belt unit is put on. The infant restraining device disclosed in this publication comprises three independent units, i.e. a seat unit where an infant is seated, a back unit where the infant leans the back on, and a pad for restraining and protecting chest of the infant.

After assembling these three units in proper manner, this infant restraining device for vehicle is placed on vehicle seat and is used. For example, for an infant, an assembly of the seat unit and the back unit connected together as an assembly are placed on the vehicle seat. After the infant is seated on the seat unit, the pad is

applied on chest of the infant, and the infant is restrained and protected by the seat belt unit via the pad. In this case, vertical and horizontal (front-back) position of the infant are adjusted by the seat unit and the back unit, and webbing is guided by the pad. Thus, the webbing correctly fits the infant. Therefore, seat unit, back unit and pad are used in combination for the infant.

For an infant with relatively small body, the seat unit and the back unit connected as an assembly are placed on the vehicle seat. After the infant is seated on the seat unit, the infant is directly restrained and protected by the seat belt unit. In this case, vertical and horizontal (front-back) positions of the infant are adjusted by the seat unit and the back unit, and the webbing correctly fits the infant. Therefore, for an infant with relatively small body, the seat unit and the back unit are used in combination.

Further, for an infant with relatively large body, the seat unit is placed on the vehicle seat, and after the infant is seated on the seat unit, the infant is directly restrained and protected by the seat belt unit. In this case, vertical position of the infant is adjusted by the seat unit, and the webbing correctly fits the infant. For an infant with relatively large body as in this case, it is sufficient by adjusting vertical position of the infant. Therefore, only the seat unit is used for an infant with relatively large body.

In the infant restraining device on vehicle as

disclosed in this publication, the seat unit and the back unit are connected by a belt. That is, by connecting a pair of belts mounted on left and right of the seat unit and a pair of belts mounted on left and right of the back unit, the seat unit and the back unit are connected together. Or, by inserting a pair of belts into a pair of holes on left and right of the seat unit and a pair of holes on left and right of the back unit, the seat unit and the back unit are connected together. In this case, in the infant restraining device of this publication, the seat unit and the back unit are directly connected by a velvet fastener.

However, when the seat unit and the back unit are connected together, belts on left and right of the seat unit must be connected with the belts on left and right of the back unit, or the belts on left and right must be inserted into the holes of the seat unit and the holes of the back unit. This makes the connecting of the seat unit with the back unit very troublesome, and complicated procedure is required for connecting these units. Moreover, the belts are relatively long and are bent, and the belts cause mess when the infant restraining device on vehicle is not used, and it is troublesome to store and control the infant restraining device.

It is an aim with embodiments of the present invention to provide a restraining and protective seat for infant on vehicle,

which comprises a seat unit and a back unit which may be firmly and removably connected with each other and easy to connect and store.

According to a first aspect of the present invention, there is provided a child seat for a vehicle, the child seat comprising a seat portion where an infant is to be seated, a back rest portion formed independently of the seat portion and adapted to receive the back of the infant when seated, and connecting means for selectively connecting said seat portion and said back rest portion, wherein said seat portion and said back rest portion may be combined together and set on a vehicle seat or only said seat portion be set on the vehicle seat, according to the physical size of an infant;

said connecting means comprising a first engaging member mounted on said seat portion and a second engaging member mounted on said back rest portion, said first and said second engaging members being selectively engageable with each other when one of the engaging members is in a first position relative to the other engaging member, and said first and said second engaging members not being disengageable from each other when one of the engaging members is in a second position relative to and is engaged with the other engaging member.

Advantageously the connecting means comprises an engaging shaft and a hook removably engaged with said engaging shaft, and said first engaging member is one of

either said engaging shaft or said hook, and said second engaging member is the other of either said engaging shaft or said hook.

According to a second aspect of the present invention, there is provided a seat portion where an infant is to be seated, a back rest portion formed independently from the seat unit and for receiving the back of the infant when seated, and connecting means for selectively connecting said seat portion and said back rest portion, wherein said seat portion and said back rest portion may be combined together and set on a vehicle seat or only said seat portion be set on the vehicle seat, according to the physical size of the infant;

said connecting means comprising a first engaging member mounted on said seat portion, a second engaging member mounted on said back rest portion, and a third engaging member mounted on either said seat portion or said back rest portion, said third engaging member allowing said first and said second engaging members to be disengageable from each other when it is at a first position relative to said first and said second engaging members and, when moved to a second position with respect to said two engaging members, causing said first and second engaging members to be engaged with each other and not removable from each other.

Preferably, the connecting means comprises a first zipper member, and a second zipper member removably engaged

with said first zipper member, and an actuator for engaging or removing said first and second zipper members, whereby said first engaging member is said first zipper member, said second engaging member is said second zipper member, and said third

engaging member is said actuator.

In the restraining and protective seat for infant on vehicle according to the present invention, the second engaging member mounted on the back rest unit is set at a first relative position with respect to the first engaging member. Under this condition, the first and the second engaging members are engageable with or removable from each other. Therefore, after the second engaging member is engaged with the first engaging member, the second engaging member is relatively moved from the first relative position and is set to a second relative position with respect to the first engaging member. At the second relative position of the second engaging member, the first and the second engaging members are engaged with each other and not removable from each other. Thus, the seat unit and the back rest unit are firmly connected with each other.

By simply engaging the second engaging member with the first engaging member and by relatively moving from the first relative position to the second relative position, the seat unit and the back rest unit are connected with each other. Accordingly, connecting procedure is simplified.

Further, in the present invention, when the seat unit and the back rest unit are separated from each other, both engaging shaft and the hook are not bent, and it will suffice that each of the engaging shaft and the hook is designed to be of engageable size. Thus, the engaging shaft and the hook do not extensively protrude from the seat unit on the back rest unit. This facilitates the storing of the

restraining and protective seat for infant on vehicle.

In the present invention, the third engaging member is set at the first relative position with respect to the first and the second engaging member. Under this condition, the first and the second engaging members are engageable with and removable from each other. Therefore, after the first engaging member and the second engaging member are set at an engaging position to engage with each other, the third engaging member is relatively moved from the first relative position with respect to the first and the second engaging members and is set at the second relative position. At the second relative position of the third engaging member, the first and the second engaging members are engaged with each other and not removable from each other. As the result, the seat unit and the back rest unit are firmly connected with each other.

Also, when the third engaging member is moved from the first relative position to the second relative position after the first and the second engaging members are set to a position to engage with each other, the seat unit and the back rest unit are connected with each other, and the connecting procedure can be extensively simplified.

Further, in the present invention, when the seat unit and the back rest unit are separated from each other, the first zipper member and the second zipper member do not extensively protrude from the seat unit or the back rest unit. This facilitates storing of the restraining and protective seat for infant on vehicle.

The invention will be further understood from the following description, when taken together with the attached drawings, which are given by way of example only, and in which:

Fig. 1 is a disassembled perspective view showing an embodiment of a restraining and protective seat for infant on vehicle according to the present invention;

Fig. 2 is a partially enlarged perspective view of a connecting means for connecting a seat unit and a back rest unit of the above embodiment;

Fig. 3 is a partial cross-sectional view showing connection of the seat unit with the back rest unit of the embodiment;

Fig. 4 is a partial cross-sectional view showing the condition where the restraining and protective seat for infant on vehicle with the seat unit and the back rest unit combined together is set on a seat of the vehicle in the above embodiment;

Fig. 5 is a disassembled perspective view showing another embodiment of the present invention;

Fig. 6 is a partially enlarged view of the connecting means in the embodiment of Fig. 5; and

Fig. 7 is a partially enlarged view showing the condition where the seat unit and the back rest unit are connected together in the embodiment of Fig. 5.

As shown in Fig. 1, the restraining and protective seat for seat for infant on vehicle 1 of this embodiment comprises a seat unit 2 where the infant is seated, a back rest unit 3, to which back of the infant on the seat unit is leaned, and connecting means 4 for connecting rear end of the seat unit 2 with lower end of the back rest unit 3.

As shown in Fig. 2, the connecting means 4 comprises a bearing member 5 fixedly provided on rear end of the seat unit 2, an engaging shaft 6 of cylindrical shape fixedly arranged on a recessed portion 5a of the bearing member 5, and a hook fixedly arranged on lower end of the back rest unit 3. As shown in Fig. 3, the bearing member 5 is arranged on inner side of the seat unit 2. The hook 7 is formed in semi-cylindrical shape, and inner diameter of inner peripheral surface 7a of the hook 7 is equal to or slightly larger than outer diameter of the engaging shaft 6.

As shown by solid line in Fig. 3, inner peripheral surface 7a of the hook 7 fixedly arranged on the back rest unit 3 is engaged with the engaging shaft 6 of the bearing member 5 fixed on the seat unit 2. As the result, the seat unit 2 and the back rest unit 3 are directly connected with each other. In this case, when the seat unit 2 and the back rest unit 3 are connected with each other as shown by

solid line in Fig. 3, the distance between bottom wall 5b of the recessed portion 5a of the bearing member 5 and outer peripheral surface 7b of the hook is smaller than the distance between tip 7c of the hook and surface of the engaging shaft 6 opposite to bottom surface 5b.

In the present embodiment with the above construction, when the restraining and protective seat 1 for infant on vehicle is not used, the seat unit 2 and the back rest unit 3 of the restraining and protective seat 1 are separated from each other and are stored in an adequate site in the vehicle.

In case the seat unit 2 is to be connected with the back rest unit 3 in order to use the restraining and protective seat 1 for infant on vehicle, the back rest unit 3 is first held approximately in horizontal position as shown by two-dot chain line in Fig. 3, and the back rest unit 3 is moved down from above as shown by an arrow α_1, and inner peripheral surface 7a of the hook 7 is engaged with the engaging shaft 6. Next, the back rest unit 3 is rotated counterclockwise in the direction β_1 around the engaging shaft 6 to upright position as shown by solid line. As the result, the seat unit 2 and the back rest unit 3 are directly connected together.

In this way, when the back rest unit 3 is at upright position and is connected with the seat unit 2, even when it is tried to relatively move the back rest unit 3 in vertical direction with respect to the seat unit 2, the back rest unit 3 is not relatively moved in vertical

direction because the hook 7 is engaged with the engaging shaft 6, and it is not removed from the seat unit 2. In this case, even when it is tried to relatively move the back rest unit 3 in vertical direction after relatively moving the back rest unit 3 in leftward direction in Fig. 3 with respect to the seat unit 2, the hook 7 is still engaged with the engaging shaft 6 because the distance "a" is smaller than the distance "b". Thus, the back rest unit 3 is not relatively moved in vertical direction, and it is not removed from the seat unit 2. Therefore, the seat unit 2 and the back rest unit 3 are firmly connected with each other. In this case, the engaging shaft 6 serves as the first engaging member of the present invention, and the hook 7 serves as the second engaging member of the present invention.

When it is desired to separate the seat unit 2 from the back rest unit 3 in order to store the restraining and protective seat for infant on vehicle 1, the back rest unit 3 is first rotated from upright position shown by solid line in Fig. 3 clockwise in the direction β_2 and is held in horizontal position as shown by two-dot chain line. Next, by lifting the back rest unit 3 in upward direction α_2, it is separated from the seat unit 2.

As described above, in the restraining and protective seat 1 for infant on vehicle, the back rest unit 3 can be firmly connected with the seat unit 2 by simply rotating the back rest unit 3 after the hook 7 of the back rest unit 3 is engaged with the engaging shaft 6 of the seat

unit 2 with the back rest unit 3 in horizontal position. Thus, the procedure for connecting the seat unit 2 with the back rest unit 3 can be extensively simplified.

When the seat unit 2 and the back rest unit 3 are separated from each other in order to store the restraining and protective seat 1, both the bearing member 5 and the hook 7 are not bent, and it will suffice that each of engaging shaft 6 and the hook 7 is set in an engageable size. Thus, the bearing member 5 and the hook 7 are not extensively protruded from rear end of the seat unit 2 and from lower end of the back rest unit 3. This facilitates the procedure for storing the restraining and protective seat for infant 1. In particular, in the present embodiment, the bearing member 5 and the engaging shaft 6 do not protrude from rear end of the seat unit 2 because both the bearing member 5 and the engaging shaft 6 are within the seat unit 2. Therefore, this further simplifies the procedure for storing the restraining and protective seat for infant 1.

Next, description will be given on how to use the restraining and protective seat for infant 1 of this embodiment.

First, when an infant with relatively small body is seated, the seat unit 2 and the back rest unit 3 are used in combination on the restraining and protective seat for infant 1. As described already, the back rest unit 3 is connected with the seat unit 2 in upright position, and the restraining and protective seat 1 is set on a seat 8 of the

vehicle as shown in Fig. 4. In this case, the seat unit 2 of the restraining and protective seat 1 is placed on a seat unit 9 of the seat 8 of the vehicle, and the back rest unit 3 of the restraining and protective seat 1 is brought into contact with a back rest unit 10 of the seat 8 of the vehicle. Under this condition, the back rest unit 3 of the restraining and protective seat 1 cannot be rotated clockwise in the direction β_2 as it is hindered by the back rest unit 10 of the seat 8 of the vehicle, and it is not turned to horizontal position. Thus, the back rest unit 3 of the restraining and protective seat 1 is firmly connected with the seat unit 2 and it is not removed from the seat unit 2.

After the restraining and protective seat 1 is set on the seat 8 of the vehicle, the infant is seated on the restraining and protective seat 1 and is restrained by a seat belt for vehicle as in the case of the infant restraining device for automobile disclosed in the publication as described above.

When an infant with relatively large body is seated, only the seat unit 2 of the restraining and protective seat 1 is used, and the seat unit 2 is set on the seat unit 9 of the seat 8 of the vehicle. The subsequent procedure is the same as in the case of the infant restraining device for automobile disclosed in the above publication, and detailed description is not given here.

Further, when an infant with extremely small body is seated, the seat unit 2 and the back rest unit 3 are

combined and used in the restraining and protective seat 1, and the infant thus seated may be restrained by the use of a pad as in the case of the infant restraining device for automobile disclosed in the above publication.

The bearing member 5 having the engaging shaft 6 may be provided on lower end of the back rest unit 3, and the hook 7 may be provided on rear end of the seat unit 2.

Fig. 5 is a perspective view showing another embodiment of the restraining and protective seat for infant on vehicle of the present invention. The same component as in the previous embodiment is referred by the same symbol, and detailed description is not given here.

A zipper 11 is used as the connecting means 4 in this embodiment. As shown in Fig. 5, the zipper 11 comprises a first zipper member 12 having a plurality of engaging hooks 12a, 12a, ... arranged on rear end of the seat unit 2, and a second zipper member 13 having a plurality of engaging hooks 13a, 13a, ... to be engaged with the engaging hooks 12a of the first zipper member 12. On the second zipper member 13, an actuator 14 for engaging or separating the engaging hooks 12a and 13a is provided.

In case the seat unit 2 is connected with the back rest unit 3 in order to use the restraining and protective seat 1 for infant of the present embodiment, an end of the first zipper member 12 on the seat unit 2 is inserted as shown in Fig. 6 into the actuator 14 on the back rest unit 3 in similar manner as in the case of conventional type zipper and is set at a position to engage with the second

zipper member 13. Then, by moving the actuator 14 in leftward direction γ_1, the engaging hooks 12a and 13a are engaged with each other as shown in Fig. 7, and the first and the second zipper members 12 and 13 are connected with each other. Thus, the seat unit 2 and the back rest unit 3 are directly and firmly connected with each other. In this case, the first zipper member 12 serves as the first engaging member of the invention, and the second zipper member 13 serves as the second engaging member of the invention. Further, the actuator 14 serves as the third engaging member.

To separate the seat unit 2 from the back rest unit 3, the actuator 14 is moved in rightward direction γ_2 toward right end of the zipper 11 to separate the engaging hooks 12a and 13a from each other, and the first zipper member 12 is withdrawn from the actuator 14. In so doing, the seat unit 2 and the back rest unit 3 are separated from each other as shown in Fig. 6.

As described above, it is possible in the restraining and protective seat 1 of the present embodiment to firmly connect the back rest unit 3 with the seat unit 2 by simply engaging the second zipper member 13 of the back rest unit 3 with the first zipper member 12 of the seat unit 2 and by moving the actuator 14. This extremely simplifies the procedure for connecting the seat unit 2 with the back rest unit 3 in the same manner as in the previous embodiment.

When the seat unit 2 is separated from the back rest unit 3 in order to store the restraining and protective

seat 1, both the first and the second zipper members 12 and 13 are not extensively protruded, and this simplifies the procedure for storing the restraining and protective seat for infant on vehicle 1.

The mode to use the restraining and protective seat for infant 1 of the present embodiment is the same as that of the previous embodiment, and it is not described here.

As it is evident from the above description, the seat unit and the back rest unit can be firmly connected together in the restraining and protective seat for infant of the present invention, and the connecting procedure can be extremely simplified.

According to the present invention, the members serving as the connecting means are not extensively protruded from the seat unit and the back rest unit when the seat unit is separated from the back rest unit. Thus, the members serving as the connecting means do not cause mess during storing operation. Therefore, this facilitates the procedure for storing the restraining and protective seat for infant 1.

CLAIMS

1. A child seat for a vehicle, the child seat comprising a seat portion where an infant is to be seated, a back rest portion formed independently of the seat portion and adapted to receive the back of the infant when seated, and connecting means for selectively connecting said seat portion and said back rest portion, wherein said seat portion and said back rest portion may be combined together and set on a vehicle seat or only said seat portion be set on the vehicle seat, according to the physical size of an infant;

said connecting means comprising a first engaging member mounted on said seat portion and a second engaging member mounted on said back rest portion, said first and said second engaging members being selectively engageable with each other when one of the engaging members is in a first position relative to the other engaging member, and said first and said second engaging members not being disengageable from each other when one of the engaging members is in a second position relative to and is engaged with the other engaging member.

2. A seat according to claim 1, wherein said connecting means comprise an engaging shaft and a hook removably engageable with said engaging shaft, and said first engaging member is one of either said engaging shaft or said hook, and said second engaging member is the other of either said engaging shaft or said hook.

3. A child seat for a vehicle, the child seat comprising a seat portion where an infant is to be seated, a back rest portion formed independently from the seat unit and for receiving the back of the infant when seated, and connecting means for selectively connecting said seat portion and said back rest portion, wherein said seat portion and said back rest portion may be combined together and set on a vehicle seat or only said seat portion be set on the vehicle seat, according to the physical size of the infant;

said connecting means comprising a first engaging member mounted on said seat portion, a second engaging member mounted on said back rest portion, and a third engaging member mounted on either said seat portion or said back rest portion, said third engaging member allowing said first and said second engaging members to be disengageable from each other when it is at a first position relative to said first and said second engaging members and, when moved to a second position with respect to said two engaging members, causing said first and second engaging members to be engaged with each other and not removable from each other.

4. A seat according to claim 3, wherein said connecting means comprises a first zipper member, and a second zipper member removably engaged with said first zipper member, and an actuator for selectively engaging or disengaging said first and said second zipper members,

whereby said first engaging member is said first zipper member, said second engaging member is said second zipper member, and said third engaging member is said actuator.

22

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

Application number
GB 9322558.9

Relevant Technical Fields

(i) UK Cl (Ed.M) A4L (LAAR, LBBA, LBLA, LBME, LBLE, LBLC, LBEJ)

(ii) Int Cl (Ed.5) B60N 2/28

Search Examiner
MR R STAGG

Date of completion of Search
27 JANUARY 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: EDOC

Documents considered relevant following a search in respect of Claims :-
1-2

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E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 2238717 A	1
Y	GB 2220848 A	1
Y	GB 2215594 A	1
X	EP 0232237 A2	1
X	EP 0155784 A2	1

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